Characteristics of Defined Contribution Pension Plans

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All pension arrangements -- defined contribution and defined benefit alike -- have as their fundamental purpose the systematic accumulation, during a participant's working years, of sufficient funds for retirement income to assure that the transition from work to retirement will be feasible and orderly, not only for the employee, but for the workforce and the workplace as well. The essence of the defined contribution type of pension plan is that each plan participant has an individual account, and the amount accumulated in that account when the participant retires depends on the amount of contributions made to the plan on the participant's behalf plus investment earnings these contributions produce. Rules for determining contribution amounts for plan participants are defined in the plan document.

Defined contribution pension plans are sometimes confused with thrift or profit-sharing plans. Both the conceptual and the operational differences between a defined contribution pension plan and a thrift plan for personal savings are significant, but not always obvious. Thrift plans have little or no influence on an employer's retirement or personnel policies. By contrast, pension plans do affect employers' personnel policies -- staffing, turnover, career paths, retirement ages, and of course, actually retiring. A pension plan is a shared concern, with both employers as well as employees having a stake in the provisions and end results of the plan.

We'll concern ourselves in this paper solely with defined contribution pension plans. We specifically exclude profit-sharing, thrift, tax-deferred annuity, and similar plans -- not because of their unimportance but because they don't have the specific objective or function (orderly and feasible retirement) that pension plans do. And for the most part, my comments about defined contribution pension plans will be drawn from the experience of the TIAA-CREF system, a defined contribution pension system that has worked very successfully for higher education for 65 years.

Statement of the Employer's Commitment

In most defined contribution plans, the employer promises to contribute a stated percentage of each participant's pay per month (or similar period of service) into individual accounts under the plan. As each contribution is made, the employer's obligation with respect to accruals for the period of service is satisfied. Thus, the plan is always fully funded. No additional employer payments are required to make up for funding deficits caused by investment performance that falls short of what the plan's actuary assumed. Instead, in a defined contribution pension plan, the participants take the investment risk; if investment results are less than had been hoped, for example, the pension income is also. Of course, the opposite is also true -- where investment results are greater than had been expected, the participant's income is also greater.

The amount contributed under the plan is usually a percentage of salary. A common starting point is to set the contribution percentage so that the plan produces a retirement income for the career employee that, when combined with Social Security, achieves a desired replacement ratio (pre-tax retirement income as a percent of pre-tax preretirement earnings). Commonly, for example, the plan objective is a replacement ratio of about 70%, with about half coming from Social Security and half from the pension plan. If we assume that wage increases and the pension plan's investment earnings each year match the rate of inflation, then for a 40-year career (say, from age 25 to 65), a contribution rate of about 14% of pay would fit the plan's income objective.*

The contribution rate can be split between the employer and the employee -- perhaps 10% employer and 4% employee, or 7% each for employer and employee -- or all can be made by the employer. The rate can be the same percentage for all employees, or it can differ, perhaps, by years of service. However, since the Supreme Court's Manhart decision in 1978, contributions may not differ by sex of the employee,

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*This assumes that the accumulation is converted to income at the participant's age 65, that pay-out is in the form of a single life annuity, that the assumed investment return (AIR) included in the annuity factor is 4%, that the annuity mortality table used is TIAA's Merged-Gender Mod I, with ages set back one year, which produces annuity rates about halfway between the male and female rates of the 1971 IAM Table (1, 2.5), and that an expense charge of 1/4 of 1% of assets is deducted from investment earnings each year.

and since the Norris decision this summer, benefits derived from contributions made on and after August 1, 1983 also may not differ by sex of the recipient.

The defined contribution approach to pensions imposes a valuable funding discipline on the employer-sponsor. Unlike the situation with a defined benefit plan, any failure to make full and timely contributions to a defined contribution plan directly affects plan participants and is readily apparent to them. In addition, the defined contribution approach also imposes what I'll call a cost-benefit discipline. By this I mean that defined contribution plans avoid the problem that defined benefit plans sometimes fall into, by which benefit increases are promised without concommitant funding increases. Defined contribution plans don't create for one generation of participants benefits whose funding is deferred to another generation of participants.

Integration with Social Security

Since the overall objective of the pension plan includes benefits to be received from Social Security, it is logical that the contribution rate of a defined contribution plan be designed to coordinate the plan's benefits with Social Security benefits. As Dr. McGill has written,

> To design plan benefits in recognition of Social Security benefits is known as integration. If only the general level of the PIA is anticipated, the benefits are

said to be implicitly integrated. If both the level and shape of Social Security replacement ratios are taken into consideration, then integration of the benefit formula is said to be explicit.*

Many defined contribution plans have a level, or flat, contribution rate -- an implicitly integrated design. For explicit integration, a two-tier, or step, contribution rate is often used to bring persons of high, low, and middle salary levels to retirement with combined Social Security and pension benefits that represent a more uniform percentage, or replacement ratio, of their final salaries than can be achieved with a level contribution plan. In recognition of the Social Security benefit formula's weighting toward lower-career-earnings workers, a step-rate design calls for pension contributions set at one rate on the portion of a person's salary up to a dollar limit, and at a higher rate for salary over that limit. Among typical defined contribution pension plans with step-rate provisions, the rate on the lower part of salary is between 10% and 12.5%, and the rate on the rest of salary is between 15% and 18%. The step-rate pattern has been used primarily by employers having a range of salary levels extending well beyond the Social Security wage base.

Previously the most commonly-used amount above which the higher contribution rate applied was the Social Security wage base. But the wage base has moved up so fast in recent years that if step-rate plans had not changed, the higher contribution rate would have applied to but few participants and but little of their salaries, making

*Howard E. Winklevoss and Dan McGill, Public Pension Plans: Standards of Design, Funding, and Reporting, (Homewood, IL: Dow-Jones Irwin, 1979), p. 57.

step-rate plans, in effect, level rate plans. Instead, many plans now use the current "second formula bracket point" in the Social Security PIA formula, which increases each year as the Social Security brackets change. For 1984 the second bracket point translates as an annual salary of $19,344, above which the higher step contribution rate is applied. Therefore, a plan using the bracket point approach may call for a 10% contribution on salary up to $19,344 and 15% on the excess.

Defined Contribution Pension Plans and Inflation

Earlier, in connection with the discussion of setting the plan's overall contribution rate, I assumed that employees' wage increases and the pension plan's investment earnings each year exactly match the rate of inflation. At this point I'd like to discuss the implications of this assumption, and then tackle the matter of the behavior of defined contribution pension plans in an inflationery environment.

First, consider the assumption that the plan's investment earnings match inflation. From the multi-decade historical studies of Ibbotson and Sinquefield, we know that U.S. Treasury Bill yields have shown this characteristic, with but small deviations from the CPI year by year. So the assumption is a realistic -- and maybe even a conservative -- one. To it, let's couple the assumption that an individual's wages keep even with inflation. This, too, is probably a conservative assumption, since even when the general level of wages loses ground to the price level, merit increases and promotions for individuals moderate that effect over a working lifetime.

The following table shows the effect of these two assumptions on the contributions in selected years on behalf of an individual covered by a defined contribution pension plan. The table assumes a roughly 7% annual inflation rate, but the rate itself doesn't matter; the relationships shown hold for any interest rate.

(1) Year	(2) Age	(3) Nominal Salary	(4) Contribution Rate	(5) Contribution Amount	(6) Accumulated Value at 65
1	25	$20,000	14%	$2,800	$42,000
20	45	$80,000	14%	11,200	42,000
40	65	$300,000	14%	42,000	42,000

The key column, for our purposes, is column (6). It shows that, looking backward from the point of retirement, each year's contribution was "worth" as much toward the retirement income generated as every other year's contribution, and -- what is perhaps more important -- that they are all the same as the final year's contribution. It's as though contributions were made each year based on the final year's salary. The point appears simple and obvious here, but it is often missed by those who ignore the effect of investment earnings in a defined contribution system, and who disparage it as a "career average" -based method of determining each participant's pension income.

Let's finish the point by comparing the following two equations:

(1) 15% x "final salary" x 40 years = pension accumulation

(2) 1.5% x final salary x 40 years = pension income

The first equation describes a defined contribution plan, the second a defined benefit plan. If $10 of pension accumulation produces $1 of yearly pension income, then the two formulations are equivalent.

But does $10 of pension accumulation produce $1 of pension income? There is no simple answer to this seemingly-simple question. The complexity lies principally in the choice of an interest rate for the calculation that converts an accumulation into a stream of lifetime income -- what for simplicity I'll call the Assumed Interest Rate, or AIR. The higher the AIR, the higher the income that can be paid out for life from a given accumulation. In round figures, an interest rate in the 8% range would produce a 10:1 ratio of accumulation to income.

An actual 8% earned rate would have to be sustained for the entire pay-out period, or else the level of income paid out would have to drop -- an unattractive occurrence for a retiree. It would be wiser, perhaps, to use a lower AIR than 8% -- one that would likely be sustainable over the lifetimes of all retirees. With a 4% AIR and actual earnings over 4% used to provide additional income in retirement, the pension stream would increase each year that total investment earnings were over 4%. Most important, it would increase retirees' incomes without any added funds from the plan sponsor, either at the time of the increase or at any later time. These increases come, of course, at a cost. With a 4% AIR, to get $1 of initial yearly income takes about $13.60. Stated differently, the initial income produced by a 4% AIR would be roughly three quarters of the initial income that could be provided by an 8% AIR from a given accumulation.

Timing of Employee's Retirement: "Early," "Normal," "Late," or "Phased"

Philosophically, defined contribution pension plans place more of the decision about when to retire in the hands of each individual employee than do most defined benefit plans. Defined contribution plans have a "normal" retirement age, which means the age toward which the plan funding objective is oriented. Some defined contribution plans discontinue making contributions on behalf of active employees who attain the "normal retirement age."

If an employee wants to retire before attaining the plan's normal retirement age, the income benefit payable is whatever the accumulation to that point will produce when divided by the annuity factor for the individual's attained age. Defined contribution plans don't subsidize early retirement by applying a less-than-full actuarial reduction, nor do they penalize employees who retire after the plan's normal retirement age with a less-than-full actuarial boost.

What's more, defined contribution pension plans easily accommodate a variety of styles of retirement, because starting to receive annuity income need not coincide with termination of employment from a particular employer. Under many defined contribution plans, participants may retire from an employer without beginning annuity income until they reach their 70's -- living in the meantime on part-time employment, Social Security, interest income from personal savings, or whatever other sources they may have, timing the pattern of their income to what best suits their financial needs. Until income is started, the accumulation continues to be credited with interest, and of course the later starting age spreads the accumulation over a shorter life expectancy, making each payment larger than otherwise.

Moreover, participants in defined contribution plans can be allowed to "split the accumulation" into parts, starting each part on a different date, so that they phase into receiving their full annuity income. The chief advantage of this multiple-starting-date feature is the phased retirement environment it nurtures. The suddenness and trauma of being a worker one day and a retiree the next need not occur. Phased retirement offers a chance for employers and their workers with declining physical or mental abilities to tailor the job duties and pay to the diminished capacity of an experienced worker, while part of the pension income makes up for the lower salary. Where mandatory retirement has been abolished, voluntary phased retirement may prove to be a good personnel policy with which to replace it.

Vesting and Portability

Particularly over the last decade, the importance of early vesting to achieving meaningful levels of employer-pension income has become accepted. American workers are becoming more mobile, pulled by the demands on one worker of a spouse's employment, pushed by the high rate of divorce, among many other forces. The problem of workers reaching retirement with a trail of nonvested forfeitures and and/or income benefits frozen at some inflation-depleted level has now become widely appreciated. As a result, vesting provisions in many plans are being shortened, though not perhaps as short as the immediate vesting that is characteristic of most defined contribution plans.

Vesting may be particularly important to workers whose skills are in especially heavy demand, since they are likely to be the most mobile. As an illustration, here's a snapshot from the pages of Business Week:

> When Robert B. Young, Jr. took over in 1980 as president of Lockheed Engineering & Management Services Co. (LEMSCO), he wanted to cut the cost of the company's pension plan, high by U.S. industry standards. He also needed a recruiting tool for engineers, computer programmers, and other technically skilled workers. Young's solution to both problems is a new retirement plan that guarantees immediate vesting and portability of pension contributions in place of a plan that required a worker to stay at LEMSCO at least 10 years to earn a pension. ... Now, early vesting is helping attract and keep employees, who rate pensions high on the list of Lockheed benefits instead of at the bottom. "Even though the old plan was very costly, it was valued low by workers because they didn't expect to see any advantage from it,' says Raymond H. Kann, a partner with Hewitt Associates, which helped developed the plan.*

Don Grubbs among others has argued that rapid, even immediate vesting, isn't enough, by itself, for pensions to achieve their intended purposes. Portability is also essential, he claims, for two reasons. First, immediate vesting of the contributions or benefits of

*"Pension Plans Get More Flexible," Business Week, November 8, 1982, p. 82.

highly mobile workers creates an administrative burden for an employer, requiring recordkeeping for numerous small inactive accounts. Second, he says that when pension plans allow terminating participants to cash out small benefit amounts, to ease the burden of the plan's administering these small sums, experience shows that those receiving cash spend the money rather than preserve it in a rollover IRA. There can be no disagreement with his observation that "the worker who changes jobs every few years has just as great a need for a retirement income as the one who works 10 or more years for the same employer."* And this need persists, we would add, even when the worker would dissipate the funds originally set aside for to meet that need.

The importance of immediate vesting goes beyond the realm of workers who change employers frequently but remain continuously in the workforce. It applies with equal, or greater, force to those who move in and out of the workforce -- disproportionately more women and minorities than others. Grubbs advocates a central clearinghouse to accept and administer small pension amounts, contending that a clearinghouse

> might make earlier vesting feasible from a cost-benefit standpoint for additional employers. Mobile workers would have a greater opportunity to receive retirement income reflective of most of their years of employment rather than just their longest job.*

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*Donald S. Grubbs, Jr., "Vesting and a Federal Portable Pension System," Journal of Pension Planning and Compliance, Vol 9:5 (Oct. 1983), pp. 391-397.
*Ibid.

A central clearinghouse, of sorts, is what TIAA-CREF has been operating for defined contribution pension plans in higher education for 65 years. An employee at any participating institution has contributions made to a fully and immediately vested individual annuity. When a participant moves to another institution with a TIAA-CREF defined contribution retirement plan, the new employer's contributions under its plan are made to the same annuities that were issued under the plan at the previous employer. The annuity accounts of people who move to employers that are not part of the TIAA-CREF system continue to participate in the investment experience of TIAA and/or CREF, so that small accounts -- especially those established early in a worker's career -- grow and do not constitute an administrative burden.

Further, TIAA and CREF annuities designed for use in a defined contribution pension plan have no cash or loan values. In all of our communications on this point, with both participants and participating employers, we stress that the absense of cash or loan values is necessary to provide employers with the assurance they seek that the contributions will be preserved for retirement purposes, and in return for which the plan offers full and immediate vesting.

In discussing the pros and cons of his portability proposal, Grubbs notes that implementing portability may create inequities and undermine pension benefit security. He writes,

> for many defined benefit pension plans, the assets of the plan are less than the value of vested benefits. In such a case, a transfer for one participant of assets equal to 100% of the value of his vested benefits automatically reduces the ratio of the remaining assets to

> the value of the vested benefits of the remaining participants. Not only could this this reduce the benefit security of the remaining participants, in some circumstances it could increase the potential liability of PBGC ... .*

A defined contribution pension plan needn't have this problem, and it won't if the assets in which the individual accounts are invested are "marked to market," since by definition the assets of the account are equal to the value of vested benefits. In that case, funds removed from the plan have no adverse effect on the benefit security of the remaining participants.

Communicating with Plan Participants: Clarity, Frequency, Content

It is often said of defined contribution pension plans that they do not lend themselves "to simple calculation or expression of benefits." Of course it is true that a formula-defined benefit sounds simple and clear, especially in contrast with a statement that your benefit will be whatever income the accumulation provides at the time of retirement. To forecast a defined contribution plan's benefit requires forecasts of an individual's salary levels and interest rates, among other elements. But an equally daunting set of assumptions must be made to project any particular individual's defined benefit income amount -- including assuming that the worker stays with the employer for the rest of his or her working career.

Most defined contribution pension plans can be designed to mail each participant -- those on whose behalf contributions are currently

*Ibid, p. 387.

being made as well as those with no current contributions -- a yearly report on the amount of the annuity accumulation in his or her account as of year-end. The report could also project the amount of annuity income that would be paid at the individual's retirement age under one or more preselected contribution assumptions and one or more preselectedinvestment earnings, retirement age, and lifetime income option assumptions. With appropriate software on a microcomputer, a participant could consider the effect of a variety of assumptions on the amount of retirement income the defined contribution account would produce.

In TIAA-CREF's experience, participants give these reports close attention. From the roughly three-quarters of a million reports that are mailed each year, some 50,000 people request additional income illustrations. In addition, as you'd expect, we get numerous calls and letters with a variety of questions, more or less touched off by receipt of this report. Many people keep successive years' reports, comparing each new arrival to prior years' income illustrations. While I can't claim that this is a perfect communications activity, I can report that most 84% of those responding to a 1982 survey we took of new TIAA-CREF retireees say that they were kept well informed about their annuities over the years, and most of those who didn't feel this way were people who had been in the TIAA-CREF system only a short time.

Investment Media and Investment Objectives

Since in a defined contribution pension plan the participant, not the employer, takes the investment risk, the selection of media in which to invest the contributions constitutes, in effect, part of the plan's design. What are appropriate investment media and investment objectives for a defined contribution pension plan? Media that satisfy the following two characteristics would seem to be suitable:

- Media that are likely to provide a positive real investment return, on average, over the long run -- or failing that, that are likely to provide a zero real return, on average, over the long run; and
- Media that have readily-obtainable market values, so that the account values may be easily determined, and so that if funds are withdrawn for rollover, neither the terminating worker nor the remaining participants subsidize the other.

A number of major studies indicate that short-term debt investments have these characteristics, as do long-term publicly-traded bonds and common stocks. Should defined contribution pension funds be invested in just one of these media, or spread among several? Should there be several common stock funds with different risk levels, or perhaps just one, indexed to the market as a whole? Should plan participants be free to transfer accumulations back-and-forth among funds as they prefer, or should transferability be limited? There is a diversity of viewpoints on these questions.

The main issue in the question of multiple investment alternatives arises from two different views of defined contribution pension plans. On the one hand, both employers and staff members want their pension funds committed to achieving the plan's objective of a lifetime income sufficient to make retiring financially acceptable for the career employee by normal retirement age. On the other hand, some plan participants want greater freedom to invest the funds that play such an important role in shaping their financial security, whether or not this freedom brings with it risks of undermining the pension plan's main objective for them and the employer. After all, they ask, whose money is it, anyway?

Given the freedom to switch the funds underlying their future pensions freely among an assortment of investment managers, many people might invest the monthly contributions successfully and reach retirement age with sufficient funds intact to retire. But those who don't may have little choice except to stay at work as long as they can, even though their performance may be impaired or their desire to work diminished. Moreover, staying on the payroll is easier for them -- and its consequences tougher on employers and the rest of the workforce -- where there is no mandatory retirement age. The freedom to write one's own pension investment ticket may be in step with the times, but whether it will prove to be good pension practice for the long pull remains to be seen.

Disability and Death Benefits

Defined contribution pension plans can easily make supplementary death and total disability benefits available at virtually no extra cost. In the event of the participant's death before retirement, the value of the participant's account can simply be paid to a named beneficiary, either as a single sum or as a lifetime income.

In the event of total disability, two types of disability insurance benefits are available. If the individual pension accounts are funded with annuities, it is easy to buy a waiver of premium benefit that continues contributions to the annuity as long as the participant's total disability continues until he or she reaches the plan's normal retirement age. Under TIAA-CREF annuities, this benefit determines contributions by reference to the contribution schedule under the pension plan, and increases contributions by 3% per year to account for salary increases that the participant could be presumed to have received had he or she continued working. The other type of disability benefit is, of course, the possibility of starting to receive income from the pension accumulation.

In Summary

Defined contribution pension plans have a number of especially attractive characteristics. Perhaps the three most outstanding are one, the simplicity of design and administration, two, the ease of communication of the plan's design and its benefits to participants, and three, the security that an always-fully-funded plan offers participants and its corollary, cost control for plan sponsors. Defined contribution pension plans can offer participants a wide variety of flexibilites, particularly in controlling the timing and amount of pension income and coordinating it with other sources of retirement income, all at no cost to the plan. By an appropriately designed contribution rate structure, they can be integrated with Social Security. With immediate vesting provisions, they can preserve for retirement the contributions of each employer that an individual works for, increasing the likelihood that workers who change jobs, or who are in and out of the workforce during their careers, will reach retirement with an income sufficient to make retirement's challenges affordable and attractive.